



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/538,299	06/10/2005	Masafumi Fukunaga	Q88381	1563
65565	7590	04/02/2009		
SUGHRUE-265550				
2100 PENNSYLVANIA AVE. NW				
WASHINGTON, DC 20037-3213				
EXAMINER				
JOYCE, WILLIAM C				
ART UNIT		PAPER NUMBER		
3656				
MAIL DATE		DELIVERY MODE		
04/02/2009		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/538,299

Applicant(s)

FUKUNAGA, MASAFUMI

Examiner

William C. Joyce

Art Unit

3656

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 February 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 is/are pending in the application.
- 4a) Of the above claim(s) 2-4 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 February 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/5508)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____
- Paper No(s)/Mail Date _____

DETAILED ACTION

This Office Action is in response to the Election filed February 20, 2009 for the above identified patent application.

Election/Restrictions

1. Claims 2-4 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected Group, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on February 20, 2009.

Priority

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

3. Figures 13 and 14 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: "L₁" and "S_A" (claim 1). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

5. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

6. The abstract of the disclosure is objected to because it should be a single paragraph in the range of 50 to 150 words, and the implied phrases, such as "the present invention" (line 1 and elsewhere) should be deleted. Correction is required. See MPEP § 608.01(b).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kabayashi (USPub 2002-0037123) in view of Iwata (JP 2001-304273).

Kabayashi discloses a four-point contact ball bearing comprising: an outer member which has a raceway surface (1) on an inner periphery thereof, an inner member which has a raceway surface (2) on an outer periphery thereof, plural balls (3) disposed in a row between the outer and inner members, and a retainer (4) for disposing the plural balls at equal intervals in a circumferential direction thereof, the balls being in two-point contact with each of both raceway surfaces of the outer member and the inner member, wherein a ratio of the diameter d_B of the balls 3 to the pitch circle diameter PCD is $d_B/PCD=0.012$; and an axial gap between said outer race 1 and said inner race 2, which are in contact with each other through the balls is set at a negative value.

Kabayashi does not disclose the relationships:

(A) $1.5 \leq L1/d \leq 2.1$, where d designates a diameter of the ball and $L1$ designates a distance between centers of adjacent ones of the balls on the pitch circle;

(B) $0.54 \leq r/d \leq 0.59$, where d designates a diameter of the ball and r designates a curvature radius of each of grooves serving as the raceway surfaces;

(C) $15^\circ \leq \alpha \leq 25^\circ$, where α designates a contact angle between the ball and each of the raceway surfaces of the outer and inner races.

(D) $-0.050 \text{ mm} \leq SA \leq 0 \text{ mm}$, where SA is the gap between the outer race and the inner race.

The prior art to Iwata discloses a four-point contact ball bearing, where a ratio of the radius of curvature of the raceway surface of an outer race to the diameter of a ball is within the range of 0.535 to 0.56; and the contact angle between the ball and the outer and inner races is within the range of 20 degrees to 30 degrees. It would have been obvious to one of ordinary skill in the art at the time the invention was made to configure the bearing of Kabayashi with the relationships r/d and α , as disclosed by Iwata, motivation being to provide good bearing life by limiting the relationship between the curvature radius of the grooves serving as

the raceway surfaces and the diameter of a ball as well as the range of numerical value of the contact angle between the ball and the raceway surfaces.

It would have been within the skill of one in the art to configure the bearing of Kabayashi with the relationship $1.5 \leq L1/d \leq 2.1$, motivation being to provide a predetermined bearing operating capacity for a particular application.

It would have been within the skill of one in the art to configure the bearing of Kabayashi with the relationship $-0.050 \text{ mm} \leq SA \leq 0 \text{ mm}$, since Kabayashi discloses SA is a negative value and discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)..

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William C. Joyce whose telephone number is (571) 272-7107. The examiner can normally be reached on Monday - Thursday 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Ridley can be reached on (571) 272-6917. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/William C. Joyce/
Primary Examiner, Art Unit 3656
3/30/09